Hardware Installation

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Safety Guidelines

NOTE: *Products with CE marks perform their required functions safely and adhere to relevant standards as specified by CE directives, provided they are used according to their intended purpose and that the instructions in this manual are followed. The protection provided by the equipment may be impaired if this equipment is used in a manner not specified in this manual. A listing of our international affiliates is available on our web site at http://www.automationdirect.com.*

Warning: Providing a safe operating environment for personnel and equipment is your responsibility and should be your primary goal during system planning and installation. Automation systems can fail and may result in situations that can cause serious injury to personnel or damage to equipment. Do not rely on the automation system alone to provide a safe operating environment. You should use external electromechanical devices, such as relays or limit switches, that are independent of the PLC application to provide protection for any part of the system that may cause personal injury or damage. Every automation application is different, so there may be special requirements for your particular application. Make sure you follow all national, state, and local government requirements for the proper installation and use of your equipment.

Plan for Safety

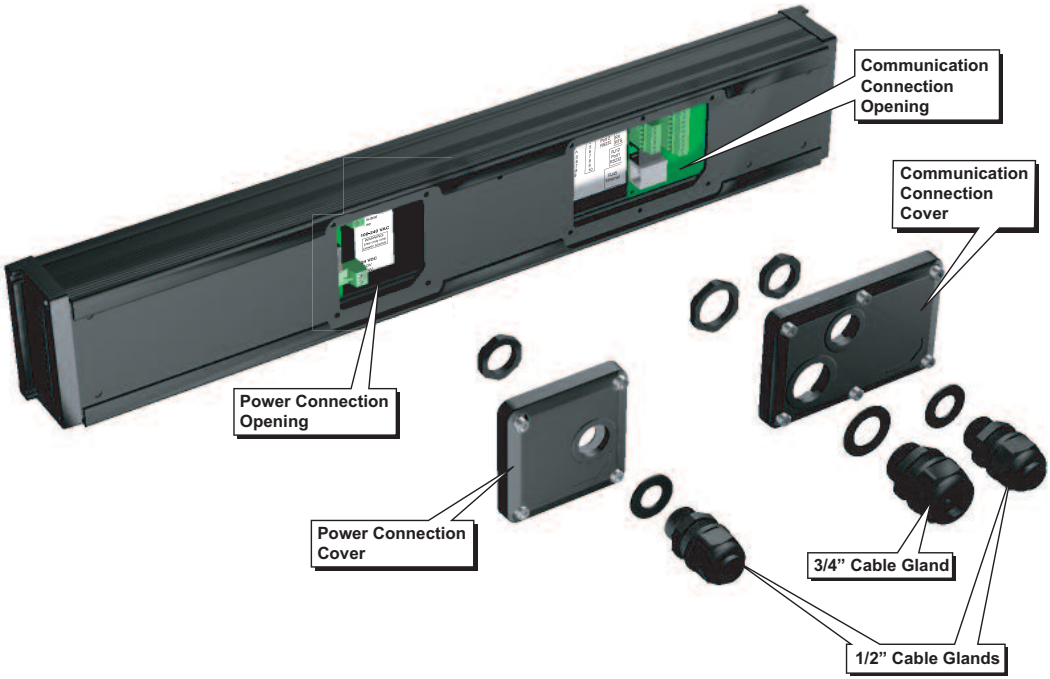
The best way to provide a safe operating environment is to make personnel and equipment safety part of the planning process. You should examine every aspect of the system to determine which areas are critical to operator or machine safety. If you are not familiar with PLC system installation practices, or your company does not have established installation guidelines, you should obtain additional information from the following sources.

- NEMA — The National Electrical Manufacturers Association, located in Washington, D.C., publishes many different documents that discuss standards for industrial control systems. You can order these publications directly from NEMA. Some of these include:
  ICS 1, General Standards for Industrial Control and Systems
  ICS 3, Industrial Systems
  ICS 6, Enclosures for Industrial Control Systems
- NEC — The National Electrical Code provides regulations concerning the installation and use of various types of electrical equipment. Copies of the NEC Handbook can often be obtained from your local electrical equipment distributor or your local library.
- Local and State Agencies — many local governments and state governments have additional requirements above and beyond those described in the NEC Handbook. Check with your local Electrical Inspector or Fire Marshall office for information.

Introduction to ViewMarq Mechanical Design

All ViewMarq displays are similar in appearance. They differ only in size and aspect ratio. The mounting brackets are identical as are the back covers and all of the power and communication connections.

The diagram below will allow you to familiarize yourself with the two main compartments, power and communications.



Power Connections and Specifications

Power Connections Cover

The power connections cover has a 0.83 in (21.1 mm) diameter opening for the supplied 1/2" NPT water tight cable gland or customer supplied flexible conduit connection for the power cable. The power connections cover must be installed for all applications. Cover screws should be torqued to 10 in·lbs (1.1 N·m).

NOTE: *The supplied cable glands cannot be used for UL installations. Flexible Conduit to protect cables is required to maintain UL508 rating.*

Power Installation

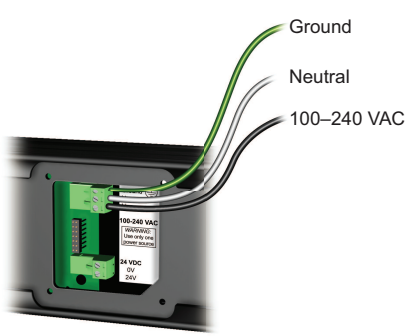
The ViewMarq message display can be powered by 100-240 VAC or by a user supplied external 24 VDC power supply.

Warning: Do not connect both AC and DC power at the same time. Internal circuit protection will prevent damage to the message display, but this is an invalid configuration and is not UL compliant.

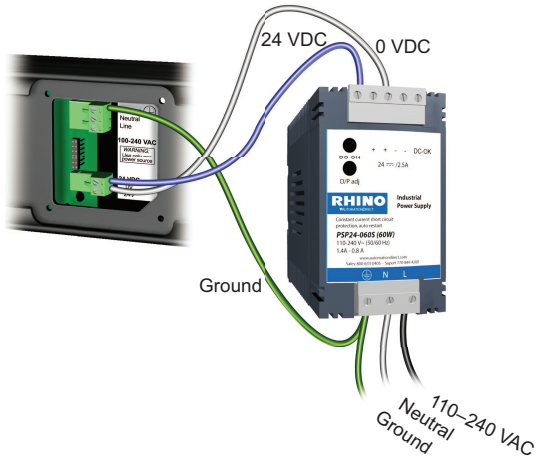
Power Supply Removable Terminal Blocks

There is a removable 2-pin 24 VDC and a removable 3-pin 120 VAC power connection terminal block supplied with each ViewMarq message display. Replacement terminal blocks, Part No. MD-TERM-SET, are available at *AutomationDirect.com*.

Power Supply Removable Terminal Blocks				
Part Number	***Terminal***	***Connector***	***Wire Size***	***Screw Torque***
MD-TERM-SET	AC Power	Removable 3-pin terminal block	12-14 AWG solid or stranded	4.5 in·lbs (0.5 N·m)
	DC Power	Removable 2-pin terminal block		



AC Power Input



DC Power Input

Model	***Max Input Power***
MD4-0112T	22W
MD4-0124T	38W
MD4-0212T	
MD4-0224T	74W
MD4-0412T	
MD4-0424T	123W

Model	***Max DC Current***
MD4-0112T	1A
MD4-0124T	1.5 A
MD4-0212T	2A
MD4-0224T	3.5A
MD4-0412T	
MD4-0424T	4A

Grounding

The ground terminal on the ViewMarq must be connected to a single point ground. Use copper stranded wire to achieve low impedance.

A good common ground reference (Earth ground) is essential for proper operation of the ViewMarq. One side of all control and power circuits and the ground lead on flexible shielded cable must be properly connected to Earth ground. There are several methods of providing an adequate common ground reference, including:

a) Installing a ground rod as close to the panel as possible

b) Connection to incoming power system ground

Ambient Temperature

Evaluate any installations where the ambient temperature may approach the lower or upper limits of the specifications.

Communications Connections

Communication Connections Cover

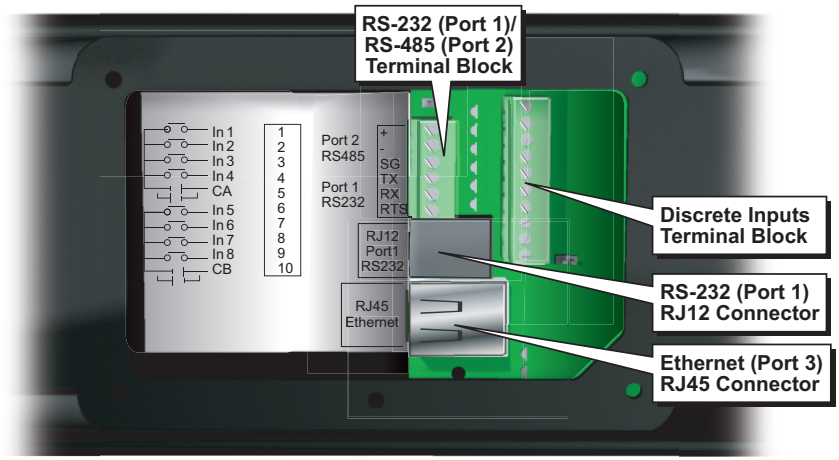
The communication connections cover has a 0.83 in (21.1 mm) diameter and a 1.06 in (26.9 mm) diameter opening for the supplied 1/2" NPT and 3/4" NPT water tight cable glands or customer supplied flexible conduit connections for communications. The communication connections cover must be installed for all applications. Cover screws should be torqued to 10 in·lbs (1.1 N·m).

NOTE: *The supplied cable glands cannot be used for UL installations. Flexible Conduit to protect cables is required to maintain UL508 rating.*

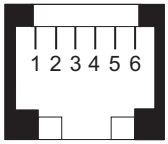
Communication Connectors

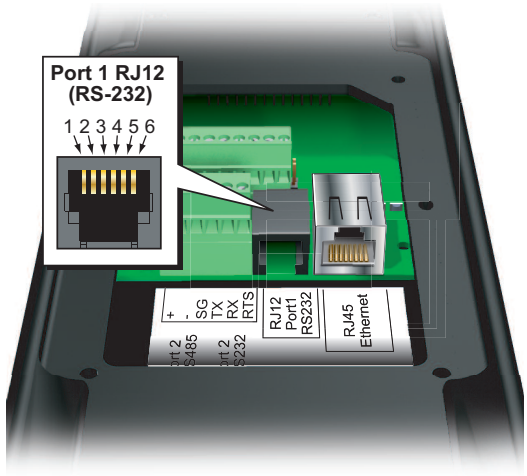
The following table describes the communication connections available in the ViewMarq display.

Communications and Discrete Input Connections				
Port	***Type***	***Connector***	***Wire Size***	***Screw Torque***
Port 1	RS-232	RJ12	n/a	
Port 1 / Port 2	RS-232 / RS-485	Removable 6-pin terminal block	14-28 AWG	1.7 in·lbs (0.2 N·m)
Port 3	Ethernet	RJ45	n/a	
Port 4	Discrete Inputs	Removable 10-pin terminal block	14-28 AWG	1.7 in·lbs (0.2 N·m)

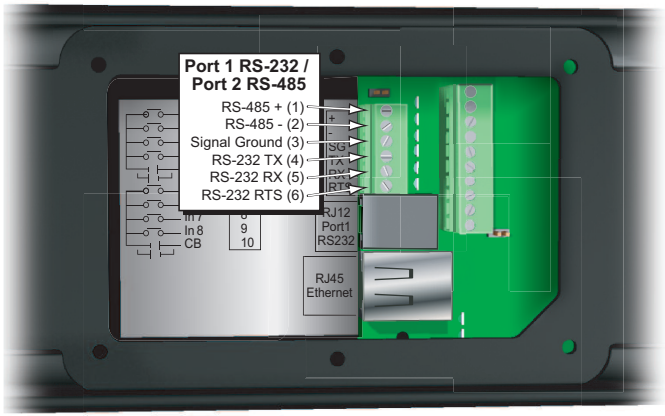


RS-232 Port 1 RJ12 Connector

Port1 - RS-232 RJ12 Connector		
Female RJ12 	**Pin Number**	**Signal Name**
	1	Signal GND
	2	Not Used
	3	RXD
	4	TXD
	5	Not Used
	6	Signal GND

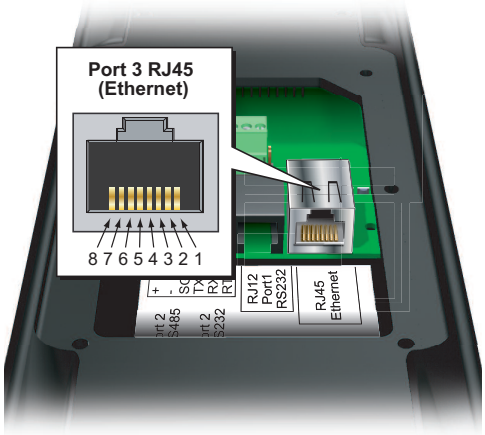


Port 1 RS-232 / Port 2 RS-485 Terminal Block Connection



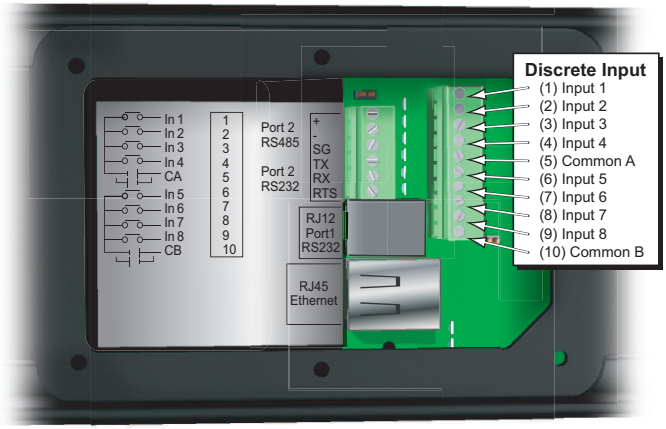
6 Position Terminal Block Pin Number	*Signal Name*
1	RS-485 +
2	RS-485 -
3	Signal Ground
4	RS-232 TX
5	RS-232 RX
6	RS-232 RTS

Port 3 Ethernet Connection



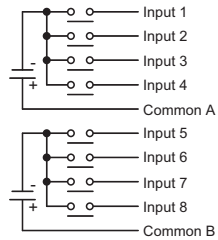
RJ45 Ethernet Connector Pin Number	Signal Name
1	TD+
2	TD-
3	RD+
4	No Connection
5	No Connection
6	RD-
7	No Connection
8	No Connection

Port 4 Discrete Inputs

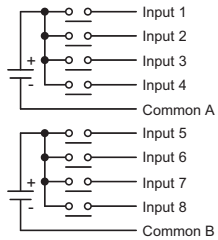


10 Position Terminal Block Pin Number	Signal Name
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Common A
6	Input 5
7	Input 6
8	Input 7
9	Input 8
10	Common B

Sourcing Input Wiring



Sinking Input Wiring



NOTE: *In order to maintain UL508 rating, discrete inputs must be powered from a Class 2 power supply.*

ViewMarq Mounting

Two sets of mounting bracket assemblies are supplied with each display. There is one pair of wall mounting brackets and one pair of chain mount brackets.

These are the general guidelines for mounting the display:

- Only qualified personnel should mount the ViewMarq LED display.
- Verify correct operation of the display on a test bench before mounting. After testing, disconnect power and communications until after the display is mounted.
- The ViewMarq LED Display is rated for indoor use only and should not be mounted outdoors.
- Protect the lens from scratches while installing the display.
- Do not remove the end caps. This will invalidate the NEMA ratings and void the warranty.
- Do not drill or cut holes in any part of the display. This will invalidate the NEMA ratings and void the warranty.

Installation Notes

- In order to maintain UL508 rating, flexible conduit must be used in place of included cable glands.
- The UL508 rating does not apply for a chain mounted display.
- In UL508 installations the allowable ambient air temperature range is 0 - 60 °C (32 - 140 °F)
- In order to maintain UL508 rating, discrete inputs must be powered from a Class 2 power supply.

Use the appropriate hardware and fasteners to hang or suspend the display. All hardware, fasteners and mounting methods must be rated for a minumum of **Four** times the weight of the display.

ViewMarq LED Display Weights

Part Numbers	*Weight*	*Weight with Wall Mount Brackets*	*Weight with Chain Mount Brackets*
MD4-0112T	4.9 lbs (2.2 kg)	6.1 lbs (2.8 kg)	5.4 lbs (2.5 kg)
MD4-0124T	9.0 lbs (4.1 kg)	10.2 lbs (4.6 kg)	9.6 lbs (4.4 kg)
MD4-0212T	7.3 lbs (3.3 kg)	8.5 lbs (3.9 kg)	7.8 lbs (3.5 kg)
MD4-0224T	13.1 lbs (6.0 kg)	14.3 lbs (6.5 kg)	14.7 lbs (6.7 kg)
MD4-0412T	12.1 lbs (5.5 kg)	9.5 lbs (4.3 kg)	9.7 lbs (4.4 kg)
MD4-0424T	22.5 lbs (10.2 kg)	18.5 lbs (8.4 kg)	18.7 lbs (8.5 kg)

Mounting Position

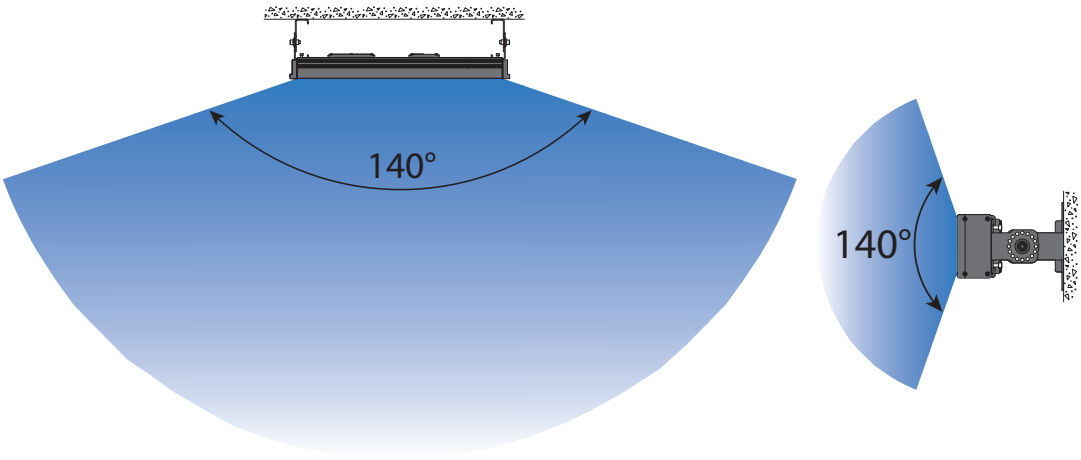
The ViewMarq LED display is intended to be mounted horizontally. It may be mounted in either horizontal direction. When the unit is flipped, the display text will automatically adjust to the correct orientation. To disable this feature, see Chapter 6 - Configuring the ViewMarq LED display.

Mounting Clearance

Mount the ViewMarq LED display so as not to exceed the minimum bending radius of the flexible conduit and / or cable glandss and cables. Mounting the display with the included wall mounting brackets should allow for adequate clearance. Be sure to provide ample clearance when using chain mounts.

Viewing Angle and Distances

The ViewMarq LED display should be mounted based on the expected viewing angle and viewing distance. The horizontal and vertical viewing angle of all signs is 140°.

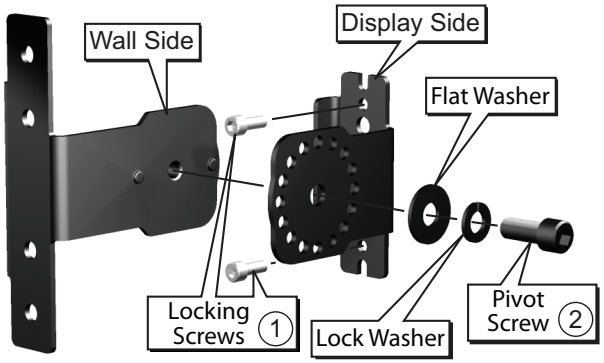


The table below shows the recommended viewing distances based on the character size that will be used.

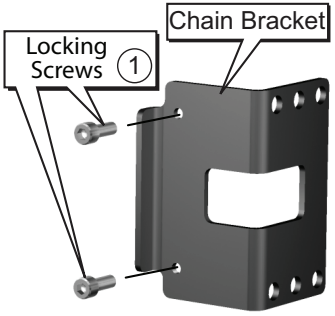
Part Numbers	Font Size	Minimum Recommended Viewing Distance	Maximum Recommended Viewing Distance
MD4-0112T MD4-0124T MD4-0212T MD4-0224T MD4-0412T MD4-0424T	1-1/4 in	6 ft (1.8m)	60 ft (18m)
MD4-0112T MD4-0124T MD4-0212T MD4-0224T MD4-0412T MD4-0424T	2 in	10 ft (3.0m)	100 ft (31m)
MD4-0212T MD4-0224T MD4-0412T MD4-0424T	4 in	20 ft (6.1m)	200 ft (61m)
MD4-0412T MD4-0424T	6 in	20 ft (6.1m)	300 ft (91m)
MD4-0412T MD4-0424T	8 in	20 ft (6.1m)	400 ft (122m)
MD4-0412T MD4-0424T	10 in	20 ft (6.1m)	500 ft (152m)

Mounting Brackets

Wall mount and chain mount brackets are shipped with each display.



Wall Mount Bracket - 2 each

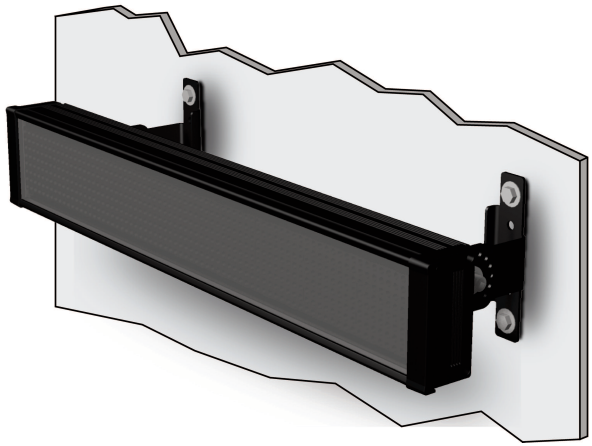


Chain Mount Bracket - 2 each

① Locking Screws - (#10-32 x 1/2" SHCS) for 4mm Hex Key.
② Locking Screws - (5/16-18 x 5/8" SHCS) for 6mm Hex Key.

Wall Mounting

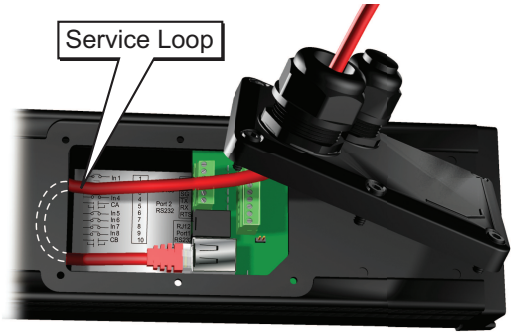
This is an example of a wall mounted installation.



1) Assemble both adjustable wall brackets as shown above. Slide a bracket into the display mounting rail that runs the length of the back of the display. Repeat for the opposite end. Place each bracket in the desired position and finger-tighten the two locking screws in each bracket to prevent them from sliding.

2) Hold the ViewMarq display in the desired mounting position and mark where the mounting bracket holes are positioned on the mounting surface.
3) Disassemble the mounting brackets, leaving the "display side" of the brackets in the display mounting rail.
4) Attach the "wall side" of the brackets to the mounting surface using appropriate fasteners for the type of mounting surface. Make sure the brackets are level with each other. (Wall mounting hardware is not included.)
5) Install the power and communication cabling through the appropriate cable glands and covers. Connect power and communication cables to their ports on the message display.

6) Install the covers and make sure that there is enough cable inside the housing to provide a "service loop" so as not to exceed the minimum bend radius of the cable

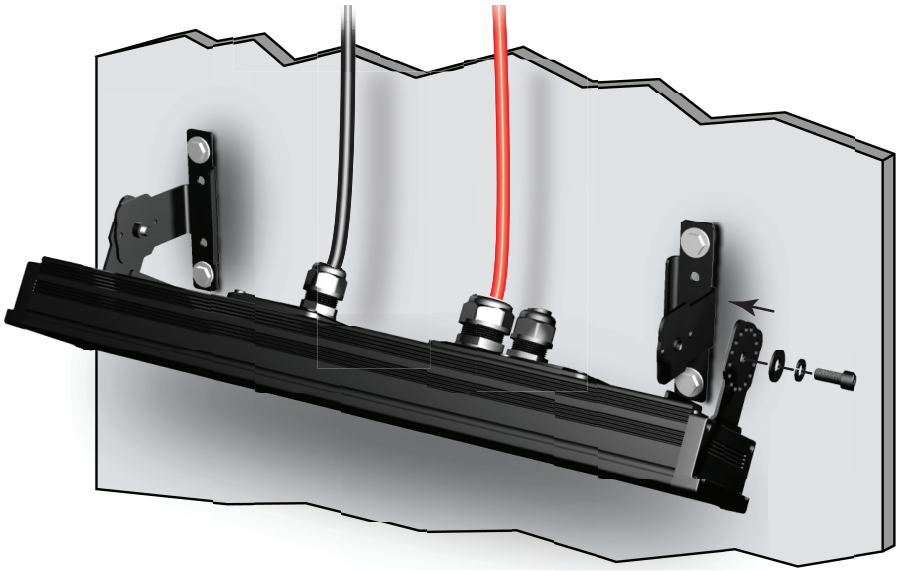


7) Install covers being careful to observe the orientation keying. Tighten the captive cover screws to 10 in·lbs (1.1 N·m). Properly tighten the cable glands to maintain the NEMA rating on the enclosure.

8) Loosen the "display side" brackets to allow movement in the display mounting rail. Align one "display side" bracket on the display with the corresponding "wall side" bracket on the wall and finger tighten the pivot screw with the flat washer and lock washer.

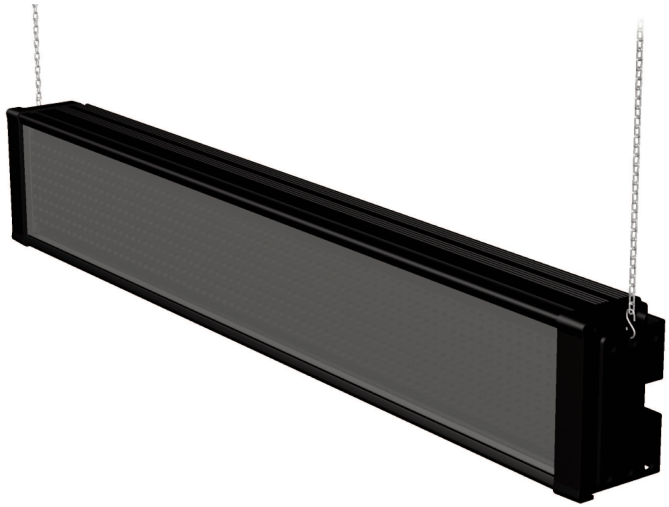
9) While holding the display in position slide the other "display side" bracket in the mounting rail on the display to line up with the other "wall side" bracket and insert the 6mm pivot screw with the flat washer and lock washer as shown.

10) Set the desired viewing angle and tighten the pivot screws to 6 in·lbs (0.7 N·m) of torque. Tighten the locking screws to 9 in·lbs (1.0 N·m) of torque.

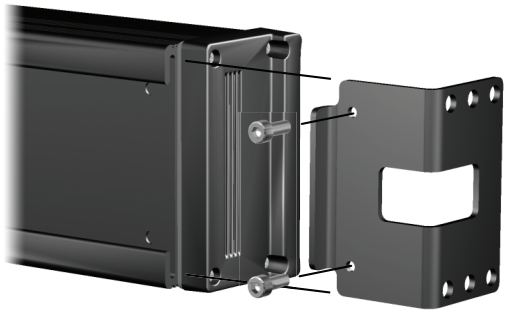


Chain Mounting

This is an example of a chain mounted installation.

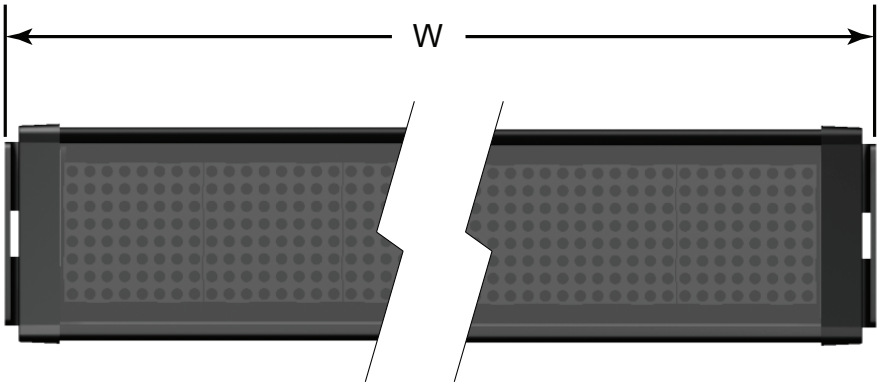


1) Slide the chain mount brackets into the display mounting rail on each end of the display. Tighten the locking screws to 9 in-lbs (1.0 N-m).



2) Attach a chain to an appropriate mounting surface or structure at the width listed in the table below. Connect the chain ends to one of the chain mounting holes on each bracket to achieve the desired viewing angle.
3) Install the appropriate cabling per steps 5 – 7 in the wall mounting procedure on the previous pages.

Continued on Next Page.



ViewMarq Chain Mount Width	
Part Number	**Overall Width with Chain Mount Brackets (W)**
MD4-0112T	23.60 in [599.4 mm]
MD4-0124T	45.21 in [1148.3 mm]
MD4-0212T	23.60 in [599.4 mm]
MD4-0224T	45.21 in [1148.3 mm]
MD4-0412T	23.60 in [599.4 mm]
MD4-0424T	45.21 in [1148.3 mm]